Sun Fire™ 6800/4810/4800/3800 Systems Site Planning Guide

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Preface

The *Sun Fire™ 6800/4810/4800/3800 Systems Site Planning Guide* helps management and site preparation personnel identify and create suitable environments for the Sun Fire cabinet-mounted systems and standalone systems.

Due to the amount of time required to plan and properly prepare a site for installation of an Sun Fire server system, you must fulfill all of the requirements outlined in this manual before your equipment arrives. Your Sun Microsystems™ account manager is available to help.

How This Book Is Organized

This book is organized into three chapters:

Chapter 1 is a worksheet for planning your space and double-checking details.

Chapter 2 lists system components, size and space requirements, and cable lengths and limitations.

Chapter 3 lists electrical and cooling specifications requirements.

Related Documentation

Application	Title	Part Number
Installation	*Sun Fire 6800 System Installation Guide*	805-7375
	Sun Fire 4810/4800/3800 Systems Installation Guide	805-7370
	Sun Fire 4810/4800/3800 Systems Cabinet Mounting Guide	806-6781
Operation	*Sun Fire 6800 System Cabinet Reference Manual*	805-7376
	Sun Fire Cabinet Installation and Reference Guide	806-2942
	Sun Fire 6800 System Getting Started	805-7374
	Sun Fire 4810/4800/3800 Systems Getting Started	805-7369
	Sun Fire 6800/4810/4800/3800 Systems Service Manual	805-7363
	Sun Fire 6800/4810/4800/3800 Systems Overview Manual	805-7362
Software	*Sun Fire 6800/4810/4800/3800 Systems Platform Administration Manual*	805-7373
	Sun Fire 6800/4810/4800/3800 System Controller Command Reference Manual	805-7372

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Cautions and Notes

Caution – This equipment contains lethal voltage. Accidental contact with centerplane, card cage, and drive areas can result in serious injury or death.

Caution – Improper handling by unqualified personnel can cause serious damage to this equipment. Unqualified personnel who tamper with this equipment may be held liable for any resultant damage to the equipment.

Individuals who remove any outer panels or open covers to access this equipment must observe all safety precautions and ensure compliance with skill level requirements, certification, and all applicable local and national laws.

Procedures contained in this document must be performed by qualified service-trained maintenance providers.

Note – Before you begin, carefully read each of the procedures in this manual. If you have not performed similar operations on comparable equipment, *do not attempt* to perform these procedures.

CHAPTER 1

Site Planning Checklist

Prior to system installation, confirm that the following requirements have been met.

1.1 System Components

- ❑ Has the system configuration been determined?
- ❑ What is the total number of systems?

1.2 Miscellaneous

- ❑ Have system administrators and operators taken the necessary Sun Microsystems training courses?

1.3 Environmental Requirements

- ❑ Does the computer room environment meet the temperature and humidity specifications listed in Table 3-1?
- ❑ Can the computer room environment specifications be maintained satisfactorily?
- ❑ Is additional fire suppression equipment required?

1.4 Facility Power Requirements

- ❑ Have you determined at what voltage the system cabinet and peripheral cabinet(s) will be operated?
- ❑ Have sufficient power receptacles been ordered for each system, monitor, and peripheral?
- ❑ Are circuit breakers properly installed and labeled?
- ❑ Are the power receptacles within 15 feet (4.6 meters) of the server cabinet system, or within 6 feet (1.8 meters) of the standalone server system?

1.5 Physical Specifications

- ❑ Has the system location been established?
- ❑ Does the equipment floor layout meet the equipment maintenance access and air flow requirements?
- ❑ Is the equipment positioned so that the exhaust air of one device does not enter the air inlet of another?

1.6 Planning Your Access Route

- ❑ Has the access route been checked against Table 2-4 for clearances of the packaged system?
- ❑ Has a proper pallet jack been checked against Table 2-5 for weight limitation for moving the system?
- ❑ Has the elevator been checked against Table 2-4 for clearances and Table 2-5 for weight restrictions of the packaged system?

CHAPTER 2

Physical Specifications

This chapter provides information about the physical characteristics of the Sun Fire 6800/4810/4800/3800 systems, including dimensions, space needs, cable sizes, and limitations.

2.1 System Components

Sun Fire systems are available in the following enclosures:

TABLE 2-1 Sun Fire System Components

Sun Fire 6800 system	Standard 19-inch x 75-inch cabinet 6 slot CPU/Memory card cage
Sun Fire 4810 system	3 slot CPU/Memory card cage
Sun Fire 4800 system	3 slot CPU/Memory card-cage
Sun Fire 3800 system	2 slot CPU/Memory card cage

The same CPU/Memory boards, PCI and CompactPCI boards, UltraSPARC™ III CPU modules, and memory modules are used in the Sun Fire systems.

Internal storage devices are not supported.

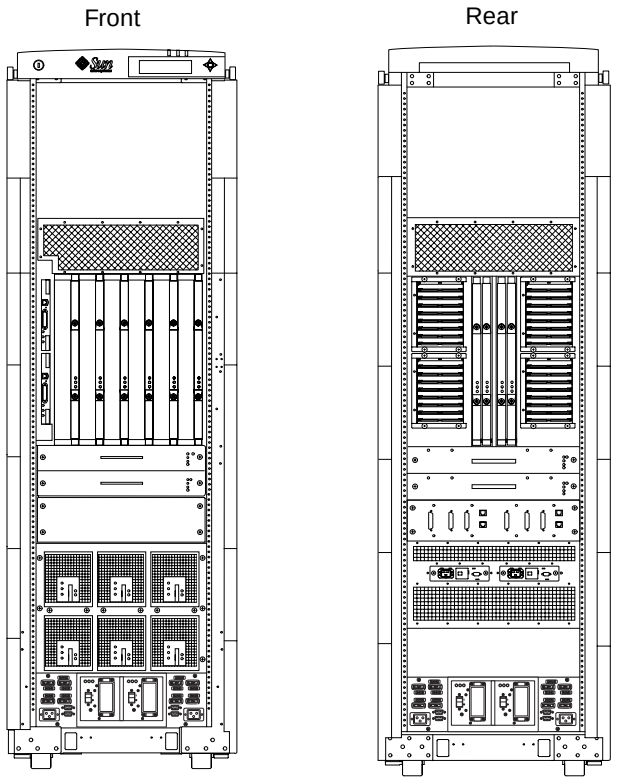

FIGURE 2-1 Sun Fire 6800 System

The maximum configuration for the Sun Fire 6800 system is:

- Data center system cabinet
- Power supply modules (PSM) (6)
- Fan trays (4)
- System Controller boards (2)
- Repeater boards (4)
- CPU/Memory boards (6)
- UltraSPARC III CPU modules (24)
- Main memory (192 Gbytes)
- I/O assemblies (4)
  - PCI I/O boards (8 slots per each I/O assembly)
- Board filler panels for any unpopulated board slots
- Redundant Transfer Units (2)
- Redundant Transfer Switches (4)

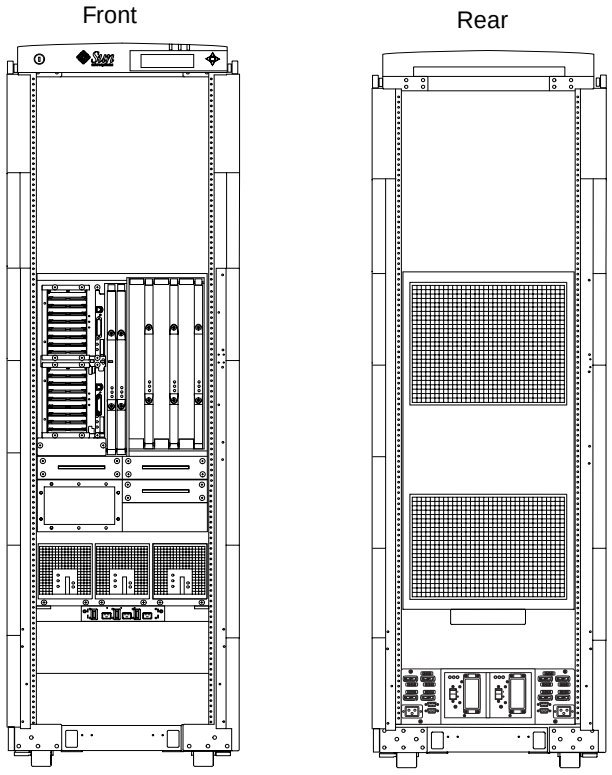

FIGURE 2-2 Sun Fire 4810 System Mounted in Optional Sun Fire Cabinet

The maximum configuration for the Sun Fire 4810 system is:

- Power supply modules (PSM) (3)
- Fan trays (3)
- System Controller boards (2)
- Repeater boards (2)
- CPU/Memory boards (3)
- UltraSPARC III CPU modules (12)
- Main memory (96 Gbytes)
- I/O assemblies (2)
  - PCI I/O boards (8 slots per each I/O assembly)
- Board filler panels for any unpopulated board slots

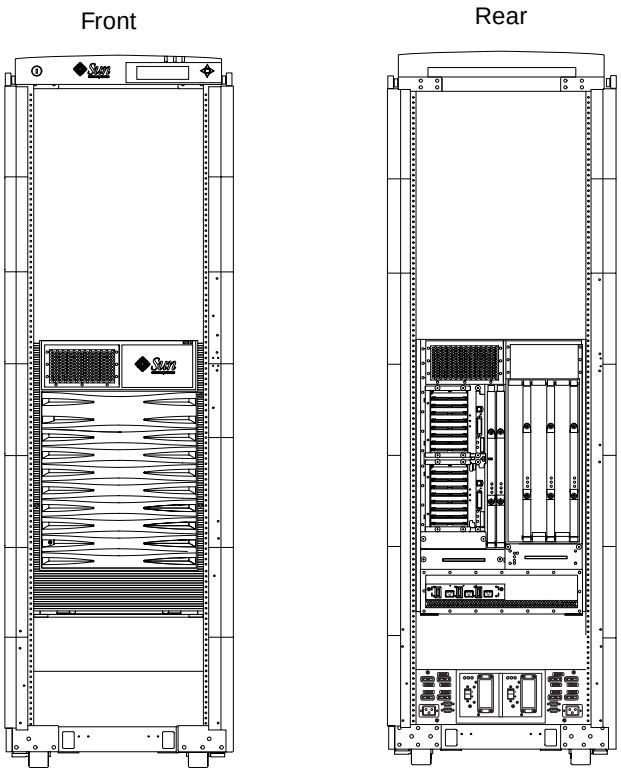

FIGURE 2-3 Sun Fire 4800 System Mounted in Optional Sun Fire Cabinet

The maximum configuration for the Sun Fire 4800 system is:

- Power supply modules (PSM) (3)
- CPU and I/O Fan trays (3)
- System Controller boards (2)
- CPU/Memory boards (3)
- Repeater boards (2)
- UltraSPARC III CPU modules (12)
- Main memory (96 Gbytes)
- I/O assemblies (2)
  - PCI I/O boards (8 slots per each I/O assembly)
- Board filler panels for any unpopulated board slots

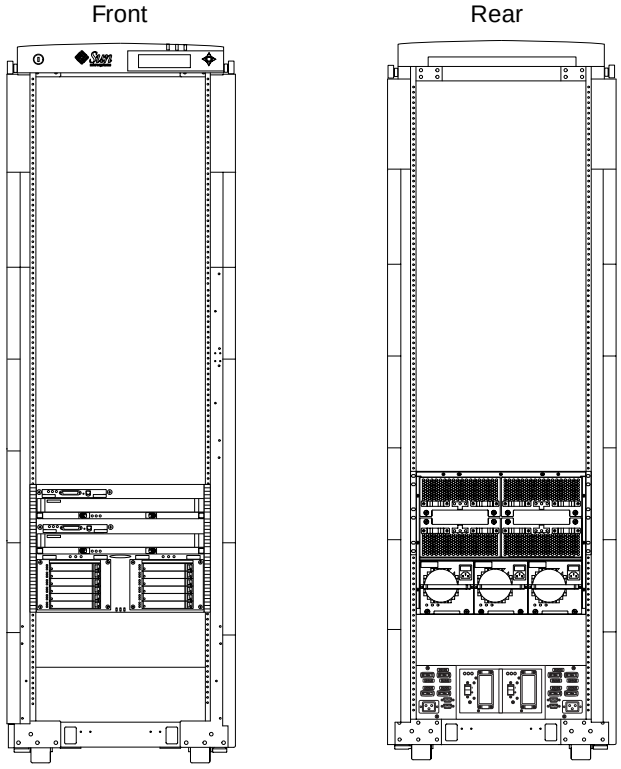

FIGURE 2-4 Sun Fire 3800 System Mounted in Optional Sun Fire Cabinet

The maximum configuration for the Sun Fire 3800 system is:

- Power supply modules (PSM) (3)
- System Controller boards (2)
- CPU/Memory boards (2)
- UltraSPARC III CPU modules (6)
- Main memory (64 Gbytes)
- I/O assemblies (2)
  - CompactPCI I/O boards (6 slots per each I/O assembly)
- Board filler panels for any unpopulated board slots

2.2 General Physical Guidelines

As you plan your space needs for the Sun Fire 6800/4810/4800/3800 systems, keep these conditions in mind:

- *Each* system requires its own power cords, connected to separate power outlets. See Chapter 3 for details on electrical requirements.
- The Sun Fire 6800 system and Sun Fire cabinet require a 30A circuit and a detachable cables. The 30A 200–240 VAC circuit breakers are supplied by the customer.
- The systems require electrical circuits that are grounded to earth.

Caution – A Sun Fire 6800 system can weigh up to a quarter-ton (250 kilograms), and can be unstable when rolling down ramps; use caution.

Consult your specific Sun Fire system installation guide for complete installation details.

2.2.1 Size and Space Specifications

Sun Fire systems and expansion cabinets can be placed next to each other, without space between them, since there are no side clearance requirements during operation. However, if access is desired, allow approximately 2 feet (60 centimeters) of space on each side to access and remove side panels.

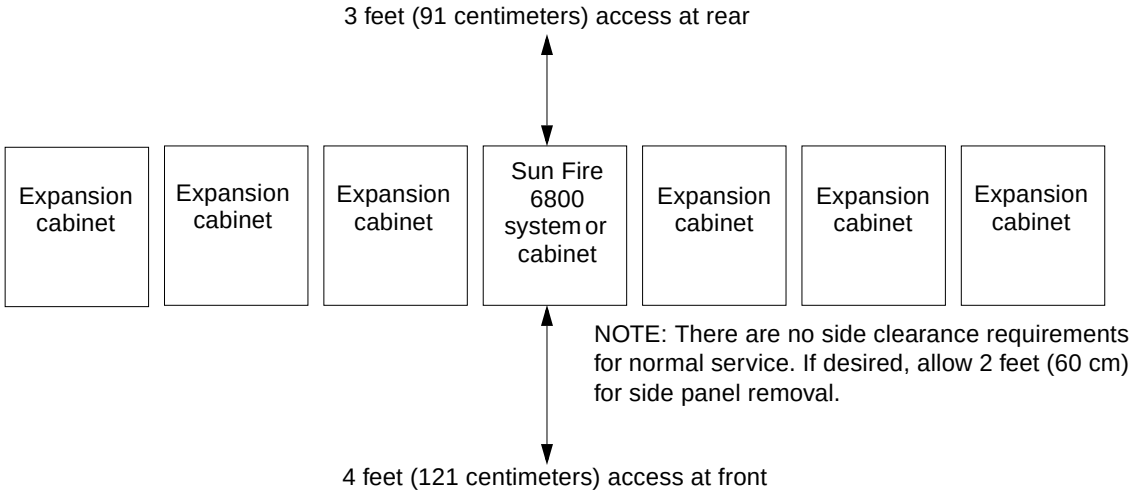
3 feet (91 centimeters) access at rear
Expansion cabinet
Expansion cabinet
Expansion cabinet
Sun Fire 6800 system or cabinet
Expansion cabinet
Expansion cabinet
Expansion cabinet
NOTE: There are no side clearance requirements for normal service. If desired, allow 2 feet (60 cm) for side panel removal.
4 feet (121 centimeters) access at front

FIGURE 2-5 Sun Fire 6800 / 4810 / 4800 / 3800 Systems Access Areas—Top View

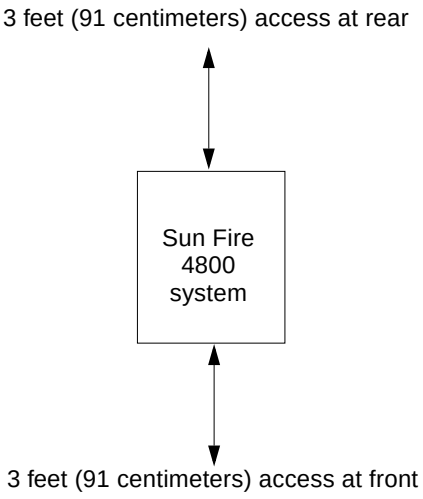

FIGURE 2-6 Sun Fire 4800 System (Deskside) Access Areas—Top View

To determine space requirements for Sun Fire systems, use the following tables:

- Table 2-2 discusses the Sun Fire 6800 system and the Sun Fire cabinet with Sun Fire 4810/4800/3800 system mounted.
- Table 2-3 discusses the Sun Fire 4810/4800/3800 systems, when not mounted in the Sun Fire cabinet.

TABLE 2-2 Physical Specifications for All Sun Fire Systems Mounted in Cabinets

Characteristic	Value
Shipping height	Sun Fire 6800 system = 80.55 in. (204.6 cm) Sun Fire cabinet = 80.25 in. (203.9 cm)
Shipping width	Sun Fire 6800 system = 42.5 in. (108 cm) Sun Fire cabinet = 42.5 in. (108 cm)
Shipping depth	Sun Fire 6800 system = 59 in. (150 cm) Sun Fire cabinet = 47 in. (119.5 cm)
Height	81.0 in. (206 cm)
Width	24 in. (61 cm)
Depth	Sun Fire 6800 system = 52.75 in. (133.9 cm) Sun Fire 4800/4810 system in cabinet = 37 in. (94 cm) Sun Fire 3800 system in cabinet = 41 in. (104 cm)
Weight	Sun Fire 6800 system = 835 lbs (312 kg) Sun Fire cabinet = 325 lbs (147 kg) Sun Fire 4810 system in cabinet = 790 lbs (348 kg) Sun Fire 4800 system in cabinet = 625 lbs (283.5 kg) Sun Fire 3800 system in cabinet = 625 lbs (283.5 kg)
Power cord length	15 ft (4.6 m)
Access requirement for front	48 in. (122 cm)
Access requirement for rear	36 in. (91 cm)
Air flow requirement for left and right sides	0

TABLE 2-3 Physical Specifications for Sun Fire 4810/4800/3800 Systems

Characteristic	Value
Shipping height	Sun Fire 4810 system = 49.7 in. (126 cm) Sun Fire 4800 system = 45.3 in. (115 cm) Sun Fire 3800 system = 33.75 in. (85.7 cm)
Shipping width	Sun Fire 4810 system = 26.75 in. (68 cm) Sun Fire 4800 system = 29.12 in. (74 cm) Sun Fire 3800 system = 24.75 in. (63 cm)
Shipping depth	Sun Fire 4810 system = 33.75 in. (85 cm) Sun Fire 4800 system = 40.5 in. (103 cm) Sun Fire 3800 system = 41.5 in. (105.5 cm)
Shipping weight	Sun Fire 4810 system = 515 lbs (234 kg) Sun Fire 4800 system = 350 lbs (159 kg) Sun Fire 3800 system = 350 lbs (159 kg)
Height	Sun Fire 4810 system = 39.1 in. (99.3 cm) Sun Fire 4800 system = 30 in. (76.1 cm) Sun Fire 3800 system = 15 in. (38 cm)
Width	Sun Fire 4810/4800/3800 systems = 17.56 in. (44.6 cm)
Depth	Sun Fire 4810 system = 21.5 in. (54.4 cm) Sun Fire 4800 system = 28.5 in. (72.3 cm) Sun Fire 3800 system = 33.3 in. (84.4 cm)
Weight	Sun Fire 4810 system = 465 lbs (211 kg) Sun Fire 4800 system = 300 lbs (136 kg) Sun Fire 3800 system = 300 lbs (136 kg)
Power cord length	8.2 ft (2.5 m)
Access requirement for front	36 in. (91 cm)
Access requirement for rear	36 in. (91 cm)
Air flow requirement for left sand right side	0

FIGURE 2-7 shows the dimensions of the Sun Fire 6800/4810/4800/3800 systems crates.

FIGURE 2-8 shows the dimensions of the Sun Fire 6800 system cabinet.

FIGURE 2-9 shows the footprint dimensions of the Sun Fire 6800 system cabinet, the Sun Fire cabinet and the Sun Fire 4800 deskside system.

See Table 3-3, Table 3-4, Table 3-5, Table 3-6, and Table 3-7 for system electrical specifications and receptacle model numbers.

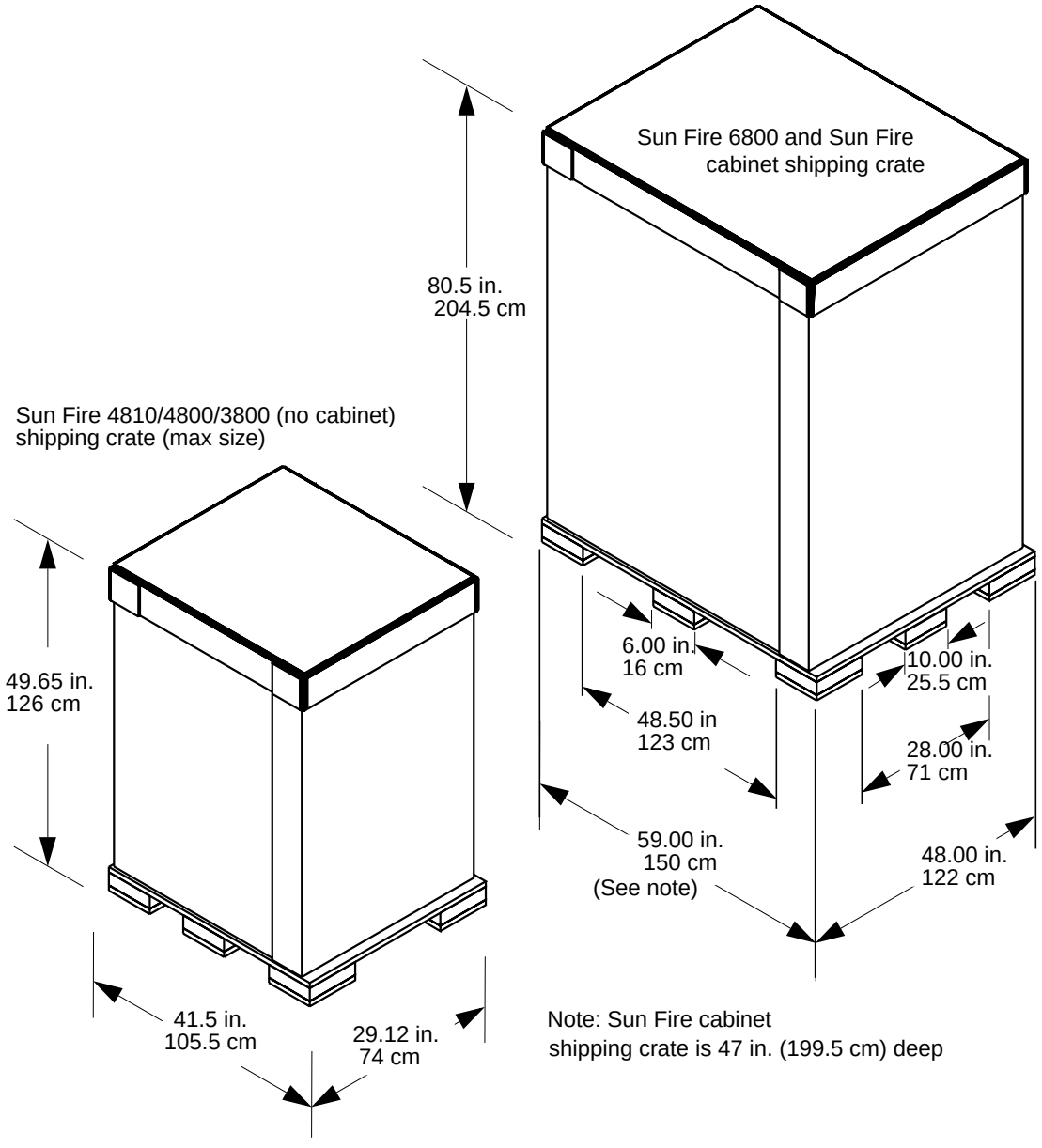

FIGURE 2-7 Shipping Crate Dimensions

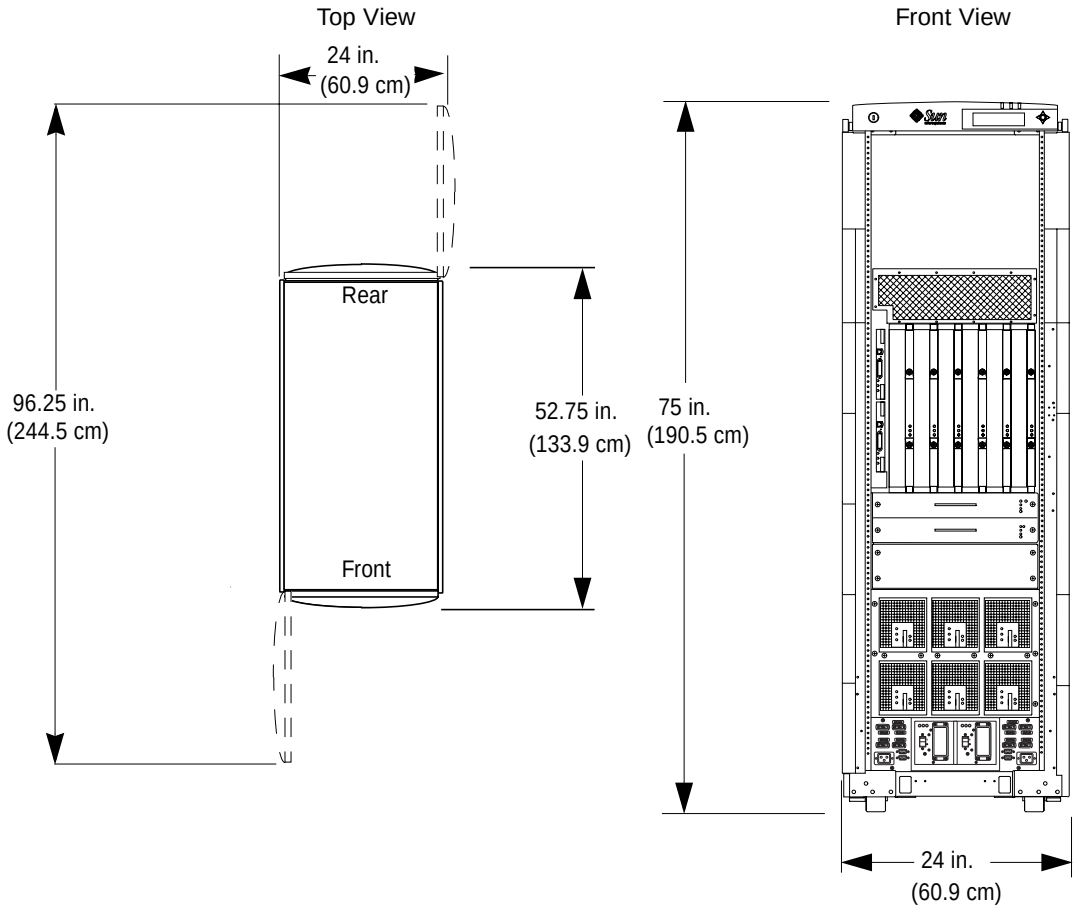

FIGURE 2-8 Sun Fire 6800 System Cabinet Dimensions

Note – For any peripheral tray in the processor cabinet OVER 20 in (50.8 cm) in length, allow additional space for access to the front or rear doors where the peripheral will be loaded.

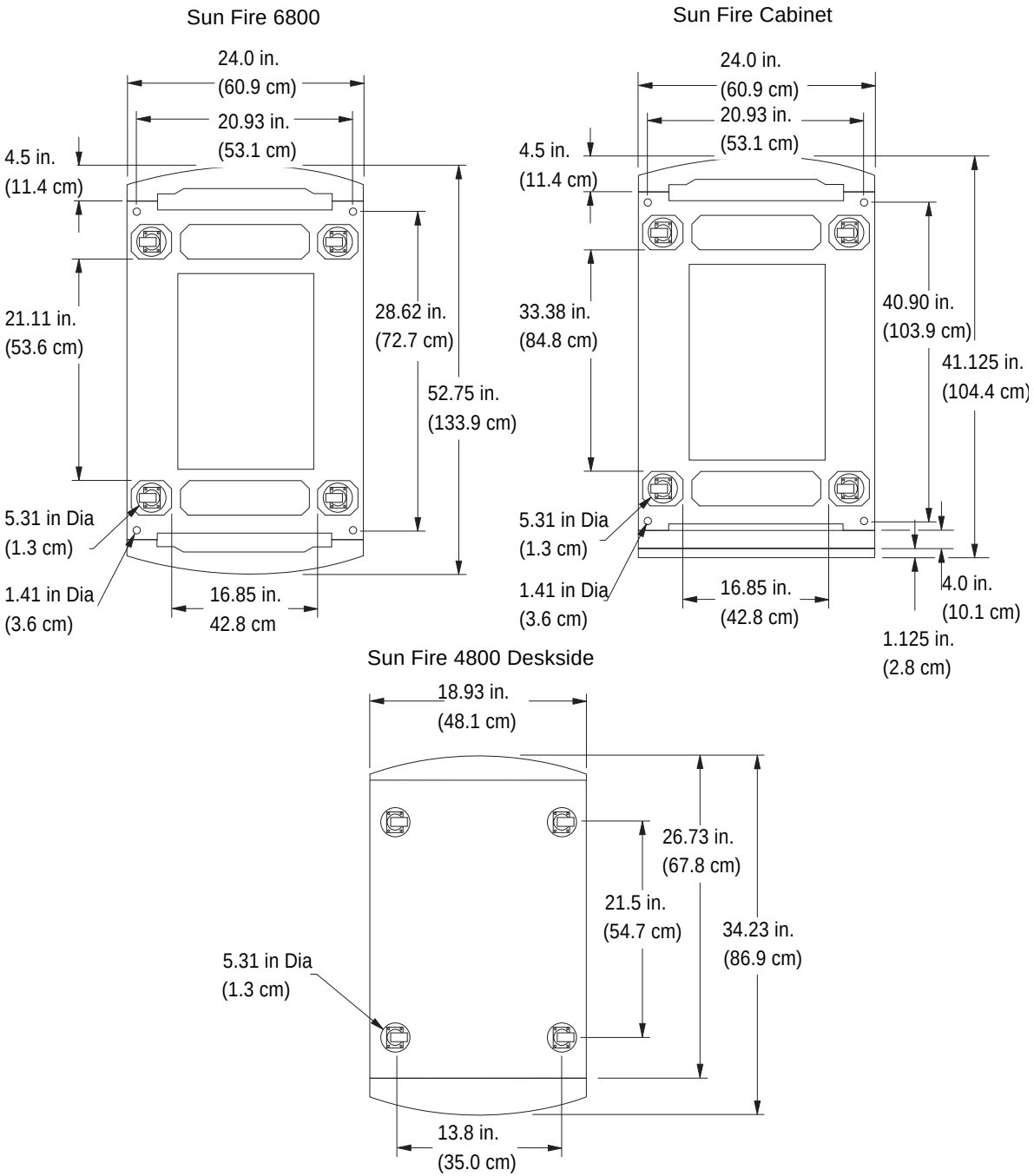

FIGURE 2-9 Sun Fire 6800/4800 and Sun Fire Cabinet—Bottom Views

2.3 Planning Your Access Route

If your existing loading dock meets height or ramp requirements for a standard freight carrier truck, you can use a pallet jack to unload the system. If not, you must provide a standard forklift[1] or other means to unload the system, or request the system be shipped in a truck with a lift gate.

See FIGURE 2-7 for an illustration of the system shipping crate and its dimensions. Each system is shipped in a separate crate. A pallet jack is required to move each shipping crate to the system location.

Leave each system in its shipping crate until it reaches its final destination. If the crate does not fit through the planned access route, partially disassemble it.

All systems not shipped in a cabinet should only be lifted by proper computer lifting equipment to prevent personal injury and/or damage to system equipment.

The entire access route to your computer room should be free of raised patterns that can cause vibration, and the route must meet the following requirements:

TABLE 2-4 Access Route Clearance

	With Shipping Pallet	**Without Shipping Pallet**
Minimum door height	81 in. (205 cm)	76 in. (193 cm)
Minimum hallway and door width	49 in. (125 cm)	25 in. (64 cm)
Minimum elevator depth	65.5 in. (166 cm)	61 in. (155 cm)
Maximum incline	10°	10°

TABLE 2-5 Weight Requirements

Minimum elevator, pallet jack and floor loading capacity (maximum weight per system)	1,200 lbs (544 kg)

1. A standard forklift has a maximum outside tine dimension of 27 in. (69 cm) and a minimum inside tine dimension of 15 in. (38 cm).

CHAPTER 3

Environmental and Electrical Specifications

3.1 Environmental Requirements

The design of your environmental control system—such as computer room air-conditioning units—must ensure that intake air to the server system complies with the limits specified in this section.

To avoid overheating:

- Guard against directing any warmed air toward the bottom of the cabinet or standalone server.
- Guard against directing warmed air toward the server access panels.

The environmental limits for Sun Fire 6800/4810/4800/3800 systems are listed in Table 3-1.

Note – When you receive your system, leave it in the shipping crate at its final destination *for 24 hours* in the environment in which you will install it. This is to prevent thermal shock and condensation.

TABLE 3-1 Environmental Limits for Sun Fire 6800/4810/4800/3800 Systems

Environmental Factor	Temperature Range	Relative Humidity	Altitude
Operating	41°F to 95°F (5°C to 35°C) derate 2°C for every 1 km up to 3 km	20% to 80%, 27°C max wet bulb (noncondensing)	sea level to 9,843 ft (3 km)
Nonoperating	-4°F to 140°F (-20°C to 60°C)	93%, 38°C max wet bulb (noncondensing)	39,370 ft (12 km)

TABLE 3-2 Optimum Ambient Environmental Operating Conditions for Sun Fire 6800/4810/4800/3800 Systems

Environmental Factor	Ambient Temperature Range	Ambient Relative Humidity
Operating	70°F to 73.5°F (21°C to 23°C)	45% to 50%,

The operating environmental limits in Table 3-1 reflect what the systems have been tested to, in order to meet all functional requirements. The optimum operating condition in Table 3-2 is the recommended operating environment. Operating computer equipment for extended periods of time at or near the temperature or humidity extremes is known to significantly increase the failure rate of hardware components. In order to minimize any chance of down-time due to component failure, it is strongly recommended that customers plan and use the optimal temperature and humidity ranges.

3.1.1 Ambient Temperature Recommendations

The ambient temperature range of 70°F to 74°F (21°C to 23°C) is optimal for system reliability and operator comfort levels. Most computer equipment can operate within a wide temperature range, but a level near 72°F (22°C) is desirable because it is easier to maintain safe associated relative humidity levels at this temperature. Operating in this temperature range provides a safety buffer just in case the environmental support systems go down for a period of time. Though individual standards vary slightly, 70°F to 74°F (21°C to 23°C) should be used as an optimal recommendation.

3.1.2 Ambient Relative Humidity Recommendations

The ambient relative humidity levels between 45% and 50% are the most suitable for safe data processing operations. Under certain circumstances, most data processing equipment can operate within a fairly wide environmental range (20% to 80%), but the optimal goal should be between 45% to 50% for several reasons:

- The optimal range helps protect computer systems from corrosivity problems associated with high humidity levels.
- It provides the greatest operating time buffer in the event of environmental control system failure.
- This range helps avoid failures or temporary malfunctions caused by intermittent interference from static discharges that occur when relative humidity is too low.

Electrostatic discharge (ESD) is easily generated and less easily dissipated in areas where the relative humidity is below 35%, and becomes critical when levels drop below 30%. The 5% relative humidity range may seem unreasonably tight when compared to the guidelines used in typical office environments or other loosely controlled areas, but it is not so difficult to maintain in a data center because of the high efficiency vapor barrier and low rate of air changes normally present.

3.2 Facility Power Requirements

To prevent catastrophic failures, the design of your power system must ensure that adequate power is provided to your Sun Fire system. Use dedicated AC breaker panels for all power circuits that supply power to your system. Electrical work and installations must comply with applicable local, state, or national electrical codes.

Provide a stable power source, such as an uninterruptible power system (UPS), to reduce the possibility of component failures. If the computer equipment is subjected to repeated power interruptions and fluctuations, it is susceptible to a higher component failure rate than it would be with a stable power source. Every Sun Fire system requires its own customer-supplied circuit breaker and AC receptacle for each power cord.

Each power cord will also supply your system with proper earth ground. Sun has tested both Sun Fire 6800 cabinets and Sun Fire cabinets for radiated and conducted emissions and have determined there is no difference in emissions with or without a ground strap grounding the cabinets. No additional earth grounding is necessary but, it may be added if desired.

The Sun Fire 6800 system has dual Redundant Transfer Units (RTUs) with four Redundant Transfer Switches (RTSs). Two totally independent power sources are needed for full power redundancy protection. A separate power source is not considered as being derived from the same transformer or UPS. RTS0 in each RTU is

connected to different power sources by separate circuit breakers. RTS1 in each RTU is also connected to different power sources by separate circuit breakers. This power configuration is to reduce the possibility of a system outage caused by a power failure.

Every piece of support equipment requires its own customer-supplied circuit breaker and receptacle(s).

3.3 Electrical and Cooling Specifications

This section provides guidelines and requirements for cooling your Sun Fire systems. For electrical and cooling specifications, see the following tables:

- Table 3-3 for Sun Fire 6800 system
- Table 3-4 for Sun Fire cabinet
- Table 3-5 for Sun Fire 4810 system
- Table 3-6 for Sun Fire 4800 system
- Table 3-7 for Sun Fire 3800 system

Be aware of the following system cooling rules and guidelines:

- The room should have sufficient air-conditioning capacity to support the cooling needs of the entire system.
- The air-conditioning system should have controls that prevent excessive temperature changes.

TABLE 3-3 Electrical Specifications for Sun Fire 6800 Cabinet

Parameter		Value
Input current	Voltage range Current, maximum Current frequency range	200–240 VAC 24A RMS at 208 VAC for each RTU 47–63 Hz
Input power rating	Total continuous power	9,600 W
Volt-ampere rating		10,000 VA
BTU rating		32,755 BTUs/hr
Power factor		0.9–0.96 (with Sun Products)
Connector type	North American International	4 - NEMA L6-30P for 200–240 VAC[1] 4 - 32A, single-phase IEC 309, for 200–240 VAC[1]
Receptacle type	North American	4 - NEMA L6-30R for 200–240 VAC[2]

1. One power cord for each RTS installed. Minimum required is two and maximum is four.
2. One receptacle type for each power cord installed.

TABLE 3-4 Electrical Specifications for Sun Fire Cabinet (Empty)

Parameter		Value
Input current	Voltage range Current, maximum Current frequency range	200-240 VAC 24A rms at 208 VAC for each RTU 47-63 Hz
Volt-Ampere rating		4,992 VA
Connector type	North American International	NEMA L6-30P for 200–240 VAC[1] 32A, single-phase IEC 309, for 200–240 VAC[1]
Receptacle type	North American	NEMA L6-30R for 200–240 VAC[2]

1. One power cord for each RTS installed. Minimum required is one and maximum is four.
2. One receptacle type for each power cord installed.

TABLE 3-5 Electrical Specifications for Sun Fire 4810 System Not Mounted in the Sun Fire Cabinet

Parameter		Value
Input current	Voltage range Current, maximum Current frequency range	200-240 VAC 10A rms at 208 VAC for each power cord (2+1 redundancy) 47-63 Hz
Input power rating	Total continuous power	4,020 W
Volt-Ampere rating		4,200 VA
BTU rating		13,716 BTUs / hr
Power factor		0.9 - 0.96 (with Sun Products)
Connector type	North American International	3 - NEMA 6-15P[1] 3 - 10A, single-phase IEC 320, for 200–240 VAC[1]
Receptacle type	North American	3 - NEMA 6-15R for 200–240 VAC[2]

1. One power cord for each power supply installed. Minimum required is two and maximum is three.
2. One receptacle type for each power cord installed.

TABLE 3-6 Electrical Specifications for Sun Fire 4800 System Not Mounted in the Sun Fire Cabinet

Parameter		Value
Input current	Voltage range	200-240 VAC
	Current, maximum	10A rms at 208 VAC for each power cord (2+1 redundancy)
	Current frequency range	47-63 Hz
Input power rating	Total continuous power	3,920 W
Volt-Ampere rating		4,100 VA
BTU rating		13,375 BTUs / hr
Power factor		0.9 - 0.96 (with Sun Products)
Connector type	North American	3 - NEMA 6-15P for 200–240 VAC[1]
	International	3 - 10A, single-phase IEC 320, for 200–240 VAC[1]
Receptacle type	North American	3 - NEMA 6-15R for 200–240 VAC[2]

1. One power cord for each power supply installed. Minimum required is two and maximum is three.
2. One receptacle type for each power cord installed.

TABLE 3-7 Electrical Specifications for Sun Fire 3800 System Not Mounted in the Sun Fire Cabinet

Parameter		Value
Input current	Voltage range Current, maximum	100-120 VAC 12A rms at 120 VAC for each power cord (2+1 redundancy) or
	Voltage range Current, maximum	200-240 VAC 7A rms at 208 VAC for each power cord (2+1 redundancy)
	Current frequency range	47-63 Hz
Input power rating	Total continuous power	2,760 W
Volt-ampere rating		2,880 VA
BTU rating		9,420 BTUs / hr
Power factor		0.9 - 0.96 (with Sun Products)
Connector type	North American	3 - NEMA 5-15P for 100–120 VAC[1] or 3 - NEMA 6-15P for 200–240 VAC
	International	3 - 15A, single-phase IEC 320, for 200–240 VAC[1]
Receptacle type	North American	3 - NEMA 5-15R for 100–120 VAC[2] or 3 - NEMA 6-15R for 200–240 VAC

1. One power cord for each power supply installed. Minimum required is two and maximum is three.
2. One receptacle type for each power cord installed. Minimum required is two and maximum is three.